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INDIAN NOTES AND MONOGRAPHS

EDITED BY F. W. HODGE

No.



35

A SERIES OF PUBLICA-
TIONS RELATING TO THE
AMERICAN ABORIGINES

JADE IN BRITISH COLUMBIA AND ALASKA, AND ITS USE BY THE NATIVES

BY

GEORGE T. EMMONS

NEW YORK

MUSEUM OF THE AMERICAN INDIAN

HEYE FOUNDATION

1923

THIS series of INDIAN NOTES AND MONOGRAPHS is devoted primarily to the publication of the results of studies by members of the staff of the Museum of the American Indian, Heye Foundation, and is uniform with HISPANIC NOTES AND MONOGRAPHS, published by the Hispanic Society of America, with which organization this Museum is in cordial coöperation.

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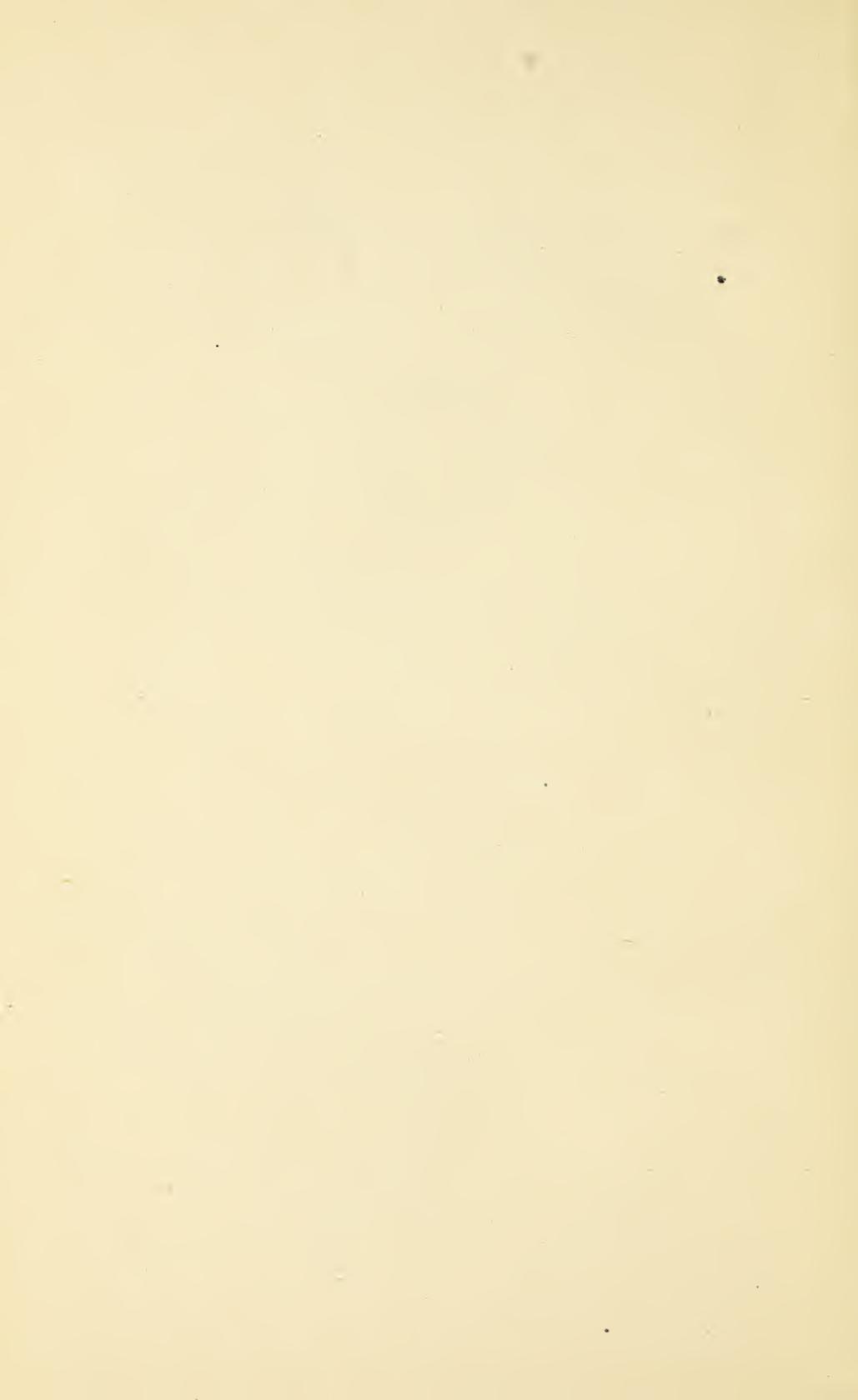
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AND MONOGRAPHS



FOREWORD



THE observations recorded in this memoir are based on a noteworthy collection of jade objects gathered by Lieutenant Emmons during many years of study among the tribes of British Columbia and Alaska, together with a few specimens belonging to other collections. The articles of jade assembled by Lieutenant Emmons, which he has deposited for exhibition in the Museum of the American Indian, Heye Foundation, are of importance not only by reason of the wide range of finished implements and ornaments which they include, but also because of the number of worked bowlders and fragments that exhibit the processes of cutting and shaping. On this account the author has had exceptional facilities for conducting the study whose results this Museum now has the privilege of making available to students.

GEORGE G. HEYE,
Director.

JADE IN BRITISH COLUMBIA AND
ALASKA, AND ITS USE BY
THE NATIVES

BY GEORGE T. EMMONS

Lieutenant, U. S. Navy, Retired

DISTRIBUTION



IT MAY be well to mention at the outset that the following notes were prepared as an introduction to and a partial description of a collection of jade gathered by the writer in British Columbia and Alaska. The term "jade" is employed throughout the paper in a general sense, and therefore includes both nephrite and jadeite, except when exact determination of the material has been made by analysis.

The occurrence of implements of jade in considerable numbers throughout the Northwest coast, and along Bering sea and

the Arctic shores of America, was a much discussed subject of equal interest to both geologists and archeologists for many years, until the mystery was solved by the discovery of the so-called Jade mountains in Alaska by Lieutenant Stoney,¹ of the United States Navy, in 1883, followed by the report of Dr Dawson,² of the Geological Survey of Canada, in 1887, on its occurrence in British Columbia, since which time little additional information has been contributed. These proximate centers unquestionably served the needs of the coast people, and the Fraser and Kowak rivers offered convenient means of transportation to the sea, where it was traded from tribe to tribe. From these widely separated localities, British Columbia supplied the coast from the Straits of Juan de Fuca to Bering bay, and the Jade mountains from the Aleutian islands to the mouth of the Mackenzie. This left an intervening section of coast about midway between these sources of supply, where little or no jade has been discovered. Odd boulders of jade have been found in

PLATE I

a. Oval, flat pebble of deep-green jade. Worn as a charm or an ornament by a Salish woman of Bridge river, British Columbia.

b. Pebble of jadeite, remarkable in color, from Stein, Fraser river, British Columbia.



DISTRIBUTION

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Washington, and as far north as Lewis river, a tributary of the Yukon. At the mouth of the Fraser, on the contiguous islands, and on the eastern shore of Vancouver island, cut bowlders and celts of jade have been found in considerable numbers, having unquestionably come down the river through centuries of trade, and possibly through migration. With more extended knowledge of the several mountain systems paralleling the coast, there is every reason to believe that under favorable geological conditions jade will be discovered throughout an extended area; but this will not controvert the fact that the material, both crude and finished, found along the coast of British Columbia and southern Alaska, came from the Fraser River district. The writer has made extended trips inland on the Skeena, Nass, Stikine, and Chilkat rivers, during which he found no evidence of local deposits as known to the inhabitants, no single rough or worked bowlders, and a noticeable scarcity of celts.

AND MONOGRAPHS

In British Columbia the area abounding in jade, as known to us from the amount collected, is the valley of the Fraser and its tributaries from Lytton northward for about thirty miles. Its source is believed to be in the bordering mountains, although as yet it has not been found *in situ*, and our knowledge of it is confined to the water-worn and sand-polished bowlders of moderate size found along the shores of the rivers, in the beds of the smaller mountain streams, and throughout the placer-fields laid bare by the mining operations of 1858.

From old village and camp sites and the sand burial mounds, great numbers of partly worked bowlders, cutting tools, and finished implements have been unearthed, and other pieces have been found in possession of the older people, which have descended to them from the past. Jade in both the rough and the finished state was the most valuable article of trade possessed by the natives. Their country was poor in animal and plant life, and salmon, their staple food, while abundant.

PLATE II

Polished boulder of homogeneous dark-green jade, exhibiting cutting grooves on both broader faces, one longitudinal, the other transverse. Found on the north bank of Fraser river, near Lytton, British Columbia.



was taken with much difficulty from the swift-flowing, confined waters of the river.

HOW REGARDED BY THE INDIANS

Among the older Salish on Fraser river the writer saw preserved rough and worked bowlders, and even fragments of implements that they had dug up in the fields and to which a fictitious value was attached. From two men were purchased, not without difficulty, several small, beautiful, deep-green pebbles, which were kept with personal belongings. Such are said to have been worn suspended from the neck as ornaments by girls and women in earlier days. In fact, another very beautiful, bright green, translucent jade pebble (pl. I, *a*) was procured from an older woman of the Lillooet band at Bridge river which she wore about the neck when a girl as a charm and an ornament. At the village of Stein, on the Fraser above Lytton, was found treasured by an old man a small pebble of a milky-white color, splashed with bright green (pl. I, *b*). It was examined by Drs Laufer and Farrington,

and pronounced by them to be a remarkable piece of jadeite from this locality, very fine in quality and color, with a specific gravity of 3.35.

There is no known instance of the working of jade by the Salish for ornamental purposes, as among the Eskimo. Among the Salish, jade or serpentine is called *sokalä'ist*, from *stokala'it*, 'green;' *äist*, 'stone,' according to Mr James A. Teit, of Spences Bridge, British Columbia.

Among the Tlingit of both sexes it was the custom to wear, in like manner, a small object, generally of carved stone, for scratching the head and body, and in three instances pieces of jade so worn were found which the wearers regarded as of greater value than like articles of other stone. One of these was a small, broken adze, in bargaining for which a year was spent.

Great value was attached to jade on account of its physical properties. Its strength and toughness combined to make it highly suited to the manufacture of keen-edged tools for carving, as the working

PLATE III

a. Core of a boulder of deep-green jade, mottled and veined, found twelve feet underground in washing for placer gold on Fraser river, near Yale, British Columbia. It exhibits five polished faces, eight grooves, and four rough ridges from which sections have been separated for the manufacture of implements.

b. Water-worn boulder of deep-green, mottled jade, found in an old burying-ground at the mouth of Thompson river, British Columbia. On one face it shows three broader and two narrower grooves, and two broken ridges from which sections have been taken. One of these ridges would seem to indicate that the section was broken transversely in the process of separation.



of iron was unknown on the coast before the coming of Europeans. Jade had no religious significance, nor was it regarded with superstition; but aside from its material worth, a certain sentiment seemed to attach to it wherever found.

EARLY REFERENCES

Possibly the first reference to the occurrence of jade on the Northwest coast is by La Perouse,³ in the extract of the narrative of the Spanish pilot Maurelle describing the natives and their implements as seen in the port of La Cruz, in Bucarelli sound, on the west coast of Prince of Wales island, in 1779. Herein is a reference to "small hatchets of silex, or greenstone, so hard as to cleave the closest wood without turning its edge."

USES

The coast tribes from Vancouver island northward to Bering bay—the Kwakiutl, Tsimshian, Haida, and Tlingit—were pre-eminent among the aboriginal woodworkers of the continent, as attested by their sub-

stantial houses, ornamental carvings, totem-poles, and canoes dug out of giant cedars—wonders of marine architecture. Before the introduction of iron, all of this work was executed with stone tools, of which the jade celt was the most important. Among the Tlingit, the value of a jade adze-blade two or three inches in length was from one to three slaves. When its owner used it, his wife should refrain from all frivolity, as any unbecoming conduct on her part might cause the blade to break.

That some of these coast people worked jade is proved by the finding of cut bowlders and sandstone tools about the mouth of the Fraser and along the eastern shore of Vancouver island; but farther north, while celts have been found everywhere, few natural or worked bowlders have been discovered, and, so far as known, no cutting tools. Dr Newcombe, of Victoria, informs the writer that he possesses a cut bowlder of jade that was found at Fort Rupert while digging at an old house-site. Among the Tlingit, throughout southeastern

PLATE IV

Worked section of bright-green jade, veined and mottled with black-green. It has been worked down on both sides, producing a uniform flat section. On one face a shallow groove extends longitudinally, and on the other face the commencement of a corresponding groove may be traced. It was dug from the site of an old living-place on the north bank of Fraser river, ten miles above Lytton, British Columbia.



Alaska, during a period of more than twenty years the writer observed no saws or other tools for working the raw material, and but two cut bowlders of jade. Of these, a small grooved specimen was in possession of a native at Chilkat; the larger piece, from which two sections had been sawed, was dug from an old house-site in the present native village of Sitka. The older natives knew what it was, but could give no information regarding its position; for the site at which it was found has been occupied only since 1821, during which time these people, in intimate contact with the Russians, have been supplied with iron and steel which superseded the earlier stone-edged implements.

The Tlingit call jade *tsu* ('green'). From the more intelligent older people questioned in 1882, little could be learned. The Tlingit generally agreed that it was obtained in trade from the south, and that it was found in the form of bowlders in mountain streams of the interior. One old man, however, claimed that in very early days it was procured from a glacial

stream flowing from the Mount Fairweather range, which later was covered by the advancing ice.

The jade celts used as adzes by the Tlingit were, like the smaller ones, found on the Fraser. It is generally believed that they were procured in finished form.

SUPERSEDED BY METAL

The culture of the early inhabitants of the valley of the Fraser, as read from archeological objects dug from old village-sites on the river benches, continued to recent times with little variation from that of the Salish people met hereabouts by the early European visitors, who brought them our products, particularly iron, that put an end to the laborious manufacture of edged tools of jade. The sudden transition from stone to metal seems evident in the number of partly cut boulders of superior quality showing deep grooves on each face, almost separating the halves, but left unfinished. The only definite statement as to the period when celts were last made was given to the writer by a man about sixty years of

PLATE V

Worked, water-worn boulder of light-green, mottled jade, from which one longitudinal section has been sawed off and a parallel groove has been commenced for the purpose of separating another section. Found at an old village-site on the north bank of Fraser river, about six miles below Lytton, British Columbia.



age, from whom was procured a fine blade of jade which he said his father had made. This would date the blade at about the period of the introduction of iron.

C H A R A C T E R O F T H E J A D E

In density and structure the Fraser mineral shows much variation, dependent on its purity or admixture with serpentine or other foreign substance, for serpentine is found in great abundance with it. In color, green prevails, with shades varying from grass-green to almost black, showing veins, splotches, mottled patches, and specks generally of a darker, sometimes of a lighter, color, partly the result of iron-stains that have penetrated the minute cracks, or of other impurities. Some pieces are beautifully translucent, while others are clouded and quite opaque. But all take a high polish; even the bowlders found in the streams have a smooth, bright surface, and few exhibit decomposition. Not all the greenish implements found hereabouts are of jade or nephrite, for serpentine and pectolite were likewise utilized.

SHAPING PROCESSES

The cut boulders are most interesting, and the great number of sandstone saws found with these definitely show the process of working them. The heavier, thicker, more irregularly shaped boulders were sawed longitudinally in parallel grooves, two or three inches deep, as shown in the illustrations (pl. II-v). In one of the grooves a wedge was fitted in such a way that, when sharply struck the impact bore on the entire length of surface with equal pressure, resulting in a lengthwise cleavage. But that this fitting of the wedge was not always perfect, may be seen in certain fractured ridges. This, of course, was a great loss, as the value of an implement depended largely on its length.

The initial cutting was accomplished by means of saws of a sharp silicious sandstone, and water. These saws were of varying length up to twelve or more inches, but being brittle they are generally found in smaller, broken pieces. They were three or four inches wide and from a quarter to

PLATE VI

a. A perfect specimen of the long "property" celt; it is of homogeneous, deep-green jade, and was dug up at an old living-place on the north bank of Fraser river, above Lytton, British Columbia. The longitudinal edges show narrow grooves.

b. Axe blade of dark reddish-brown jade. The cutting edge has a sharp, short bevel, exactly like that of a broad-axe. It was found in the ground near Lytton.

c. Adze blade of translucent blue-green jade, showing a sharp bevel on one side at the cutting edge. Found on an old village-site on the north bank of Fraser river, five miles below Lytton.

d. Celt of dark-green mottled jade, found buried three feet under the roots of an old tree at Indian Head, near Victoria, British Columbia.



b



c



d



a



half an inch in thickness. The cutting edge was sharpened, but in use it became rounded. Some saws were double-edged. The striation along the grooves of cut boulders is complementary with the gritty particles of the saws. It has been stated or suggested that the smooth surface to be cut was first scratched or roughened with a quartz crystal to give the saw a "hold." This may be questioned, for, in an examination of several incipient grooves, they show the width of the saw and no fine scratches such as the point of a crystal would make on a smooth, irregular surface; besides, quartz crystals are not abundant throughout this locality. Again, it is said that equisetum was used to roughen the surface.

Flat, thinner boulders were cut by scoring a deep groove in each face, and broken apart by a sharp blow or with a wedge driven in the groove. After separation, sections were shaped and worked with grindstones of sharp sandstone, and water; these stones, so far as could be determined, were finer in texture than the saws. The

process of working can be plainly followed by an inspection of the surfaces, but the scratches are so fine that they do not interfere with the general polish that the rubbing gave, which is the same as that of the grooves or the faces of cut bowlders, although some claim that equisetum was used to give an extra polish.

According to Mr Teit, jade worked into shape is called *steū*, or *steūu* ('worked'), *sokalä'ist* ('greenstone'); but this term is more often applied by the Salish around Lytton to the long celt. Adzes of any kind are called *xoisten*; a jade or "greenstone" adze, *sokalä'ist tek xoisten*.

CELTS AND CHISELS

Jade implements from the Fraser river section consist almost entirely of celts, with a few knife-blades and drill-points.

The celts, from their length, shape, and manner of use, may be placed in three classes, as follows:

The very long, finely finished, chisel-like blade, straight, or tapering slightly from the edge to the butt, and from six to sixteen

PLATE VII

a. Implement made of translucent, bright-green jade. From its sharpened and rounded edges at both ends it would seem to have been used as a warclub lashed to the end of a short handle, or as a skin-scaper used in the hand. It was procured from a Salish Indian of Fraser river, British Columbia.

b. Chisel-like celt of whitish-yellow jade, veined with green, tapering on one lateral side from base to cutting edge, which latter is beveled on both sides, and having a smoothed butt. Used as a hand tool, or possibly as a warclub. Found on the south bank of Fraser river, near Lytton, British Columbia.



a



b

inches in length, are characteristic of the Fraser river territory. They were made by no other people than the Salish, and were not traded to any distance. They are generally finished throughout their length, except at the base, which, though smoothed, more often exhibits the irregularity of the cut section. In some specimens, however, the base is brought to an edge. These pieces, wherever found, usually show little evidence of wear. The sharp cutting edge is more often intact, hence it is claimed by the natives that they were not made primarily for use, but represented "property," of value according to their length and quality. But certainly some were used for other purposes. One piece obtained from a native who had just dug it up on his farm on the north bank of the Fraser, about seven miles above Lytton, had been put to hard usage, as the dulled, splintered edge shows. It is a heavy implement 15 in. long, $2\frac{1}{4}$ in. wide, and $\frac{3}{4}$ in. thick. The faces and one lateral edge where it was cut from the boulder are finished; the other edge is in the rough, show-

ing the broken ridge. The base is irregular in shape, and smoothed. Such long celts never could have been hafted as adzes, and if used for woodworking could have been employed only as hand chisels, while those sharpened at both ends were possibly war implements. The best explanation of this class of celts has been given to the writer by Mr Teit and is added with his permission:

There are three sizes and shapes of jade tools you mention. The long celt [pl. VI, a] was not hafted as a common adze, and it seems that at least most of them were not used as tools at all. You will notice that many of them, at least, have no *properly prepared end* on which to strike, this end being sometimes more or less convex, sometimes irregular in outline, and generally more or less narrow and thin; also some of these long celts are double-bitted. All this would seem to show these celts were not intended as a rule to be used as chisels, adzes, or wedges. According to the old Indians these long celts were "property", and good ones exchanged for considerable value. Some of them were occasionally used as chisels or wedges, in such cases being held, it seems, in the hand, and struck with hardwood mallets. The Indians aver, however, that generally speaking they were not made for any special use as tools. Occasionally they were also used in

PLATE VIII

a. Knife of bright-green, translucent jade, with fine black specks. It has a narrow groove along one lateral side, a rounded, smoothed butt, and is beveled on both faces of the cutting edge. Found in a burial mound on Fraser river, near Lytton, British Columbia.

b. Knife of opaque, dark gray-green, veined and mottled jade, tapering slightly toward the butt, oval in cross-section, the faces equally convex. The convex cutting edge exhibits a double bevel on one side, and is straight on the other. Found near Lytton, British Columbia.

c. Knife of homogeneous, deep-green jade, leaf-shaped, with one cutting edge rounded to a dull point, but originally beveled more on one side than on the other. From a grave on Fraser river, near Lytton, British Columbia.

d, e. Two tiny chisels of bright-green jade used in etching and finer carving. From Lytton, British Columbia.

f. Chisel of green jade, slightly beveled on one face. Found in a burial mound on the north bank of Fraser river, across from Lytton, British Columbia.



the hand, for rubbing skins, but it seems their use for this was also rare. More often they were used as weapons, being hafted as tomahawks across the end of a wooden handle, in which they were inserted or set [fig. 1]. It is said, however, that they were not made especially for this purpose, but were "property," or works of art, as it were, exchanging for high values.

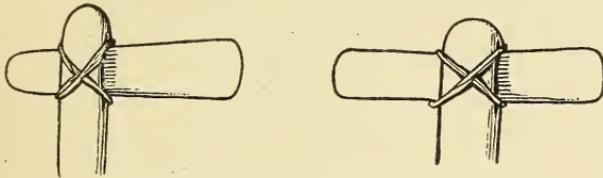


FIG. 1.—Method of hafting celts.

Celts of the second class, ranging from four to five inches in length, are broader of blade and proportionately heavier for their size (pl. VI, *b*, *c*). They taper slightly to the base, which is almost always irregular in form, sometimes rough, but generally wholly or partly smoothed; otherwise they are finished, except where a natural break occurs, while the cutting grooves are more often visible along the lateral sides. The faces generally show a slight convexity, tapering to the ends. Both faces are generally beveled to form the cutting edge, one slightly and round-

ing, the other deeply, at from a half to three-quarters of an inch from the edge, as in the case of a chisel. The cutting edge shows a slight convexity, which may be the result of wear, for often small breaks and dulled edges are seen at the ends; but in many specimens the cutting edge is slanting—intentionally so finished, from all appearances—in which case the tool was made for some special work. Where the edge is markedly rounding, the implement was used as a skin-dresser, or as a warclub. This constituted the broad-axe or adze for general woodworking, not only here but wherever found throughout the Northwest; it was the most generally distributed and important of all tools. It was hafted to a short, bent-wood handle—the limb of a tree with a small section of the trunk remaining—to which the blade was fitted and securely lashed. It is needless to add that celts so used are never double-bladed.

The third class of celts presents more varied forms. These were essentially chisels, used in wood- and bone-working, and

PLATE IX

a. Boulder of translucent blue-green jade, oblong, rounded worn ends, used as a hand-hammer. Found on an old village-site on Fraser river, opposite Lytton, British Columbia.

b. War-pick of homogeneous, deep-green jade, with slight veins of a darker color, exhibiting a central ridge along the lateral sides, gradually decreasing toward the curved end. The head or cutting edge is convex, and stands vertical when mounted. From the Stikine tribe of Tlingit, near Wrangel, Alaska.



a



b

for carving. The short, heavier blade, a smaller type of the adze, was inserted in the end of a short, straight section of elk-horn or wood (fig. 2), and possibly it served as a skin-dressing tool, as well as a chisel.

A fine bright-green jade celt (pl. VII, *a*), which had been sharpened with a rounding edge at each end (one end is broken), must have been used either as a skin-dressing implement or as a war-club lashed to the end of a wooden handle. It was collected many years ago at the mouth of Fraser river.

Long, slender, finely-finished blades might have been fitted in complementary grooves in wooden or bone handles, and secured with a seizing; but some of these are so finished and smooth at the base that they suggest hand tools. Two tiny chisel blades of light-green jade, an inch and a half long, and

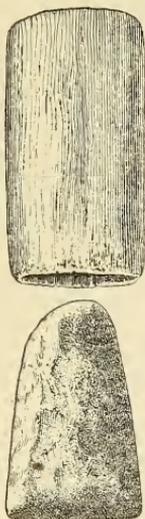


FIG. 2.—
Method of inserting chisel in bone handle. Salish.

scarcely an eighth of an inch in thickness (pl. VIII, *d*, *e*), which were dug up on the bank of the Fraser river near Lytton, must have been fitted and lashed to the ends of short handles and used in fine ornamental carving. Some of the shorter, heavier celts which show a slightly splintered and well-worn butt, may have been used as wedges in conjunction with a wooden hammer. The one shown in pl. VI, *d*, found buried three feet under the roots of a large tree at Indian Head, below Victoria, on Vancouver island, suggests this use, from its thickness and worn head.

A heavy, narrow, chisel-like celt, also shaped quite differently, in its proportion to the general type of celts found here, is shown in pl. VII, *b*. It is whitish-yellow in color, veined with green, and is finished throughout its length, tapering on one lateral side from base to cutting edge, which latter is beveled on both sides. The butt, while irregular, is smoothed, and it has the appearance of having been used in the hand, or possibly it might have been employed

PLATE X

War-pick of bright-green, translucent jade, hafted through the end of a wooden handle. Collected at Sitka, Alaska, and now in the United States National Museum at Washington.



as a warclub, the butt being inserted in the end of a wooden handle. This specimen was found on the south bank of the Fraser, near Lytton.

A chisel of more delicate proportions, finely finished throughout its length, symmetrically tapering to a point at the butt, slightly oval on one face and beveled on both edges of the other, would seem to be of the type that was inserted in a handle of bone or of wood. The specimen illustrated (pl. VIII, *f*) was dug out of a burial mound on the north bank of the Fraser river across from and above Lytton.

The Salish hereabouts designate a chisel as *manāu*, and a jade or "greenstone" chisel as *sokalä'ist tek manāu*, according to Mr Teit.

KNIVES

In addition to celts, there have been found a limited number of knives, drill-points, and odd pieces, as above mentioned. Pl. VIII, *a*, illustrates a fine specimen of knife of bright-green, translucent jade, flecked with black; it is $3\frac{3}{4}$ in. in length,

$1\frac{1}{8}$ in. in width, by $\frac{3}{16}$ in. thick, and is slightly oval in cross-section. This implement, which was found on a sand burial mound on Fraser river just above Lytton, is finished throughout, but shows a narrow groove along one lateral side. The cutting edge, which is at an angle of 25° with the lateral sides, is beveled on both faces. Judging by its shape and its rounded, smoothed butt, it was evidently a hand implement, not hafted.

The knife shown in pl. VIII, *b*, somewhat similar in shape, is of an opaque, dark gray-green, veined and mottled jade, and is also from the Lytton district. It is neatly finished throughout its length, and tapers slightly toward the butt. In cross-section it is oval, the faces equally convex. The cutting edge is convex and at an angle of 45° with the lateral sides, showing a double bevel on one side, and is straight on the other. It is probable that this knife was not hafted, but was used in the hand. It is $4\frac{9}{16}$ in. long, $\frac{5}{8}$ in. wide, and $\frac{3}{16}$ in. thick at the middle.

PLATE XI

a. Hafted adze, consisting of a blade of yellow-green jade inserted in the end of a piece of bone, which, ornamentally incised with six parallel bands in black on the under side, is lashed with seal-hide to a handle made from the penis-bone of a walrus. From Point Barrow, Alaska.

b. Hafted adze, consisting of a blade of reddish-green jade inserted in the end of a section of caribou-horn, which is lashed with seal-hide to an ornamentally cut wooden handle. From Nome peninsula, Alaska.



To what purpose these two knives were put is not known. From the angle of the sharpened edge they would seem particularly adapted for cutting skins, but this was ordinarily done with chipped basalt blades.

Pl. VIII, *c*, exhibits a knife of an entirely different type: it is of a homogeneous, deep-green jade, leaf-shaped, with one cutting edge rounding to a dull point, and is suitable for cutting fish, or as a skinning implement. The upper end has been somewhat broken and shortened, and from its size and shape it was evidently set in or secured to a handle. The edge is dulled from use, but shows where beveled slightly more on one side than on the other. It was dug up from an old grave on the south bank of the Fraser, just above Lytton. Dimensions, 3 in. long, $1\frac{3}{8}$ in. in greatest width, and $\frac{1}{8}$ in. thick.

DRILL-POINT

The only drill-point seen was of bright-green jade, about an inch and a quarter in length (fig. 3); it was found in digging

on the north bank of the Fraser, two miles above Lytton, and it is understood that another has been found thereabouts.

HAND-HAMMER

The oblong, light-green jade boulder illustrated in pl. IX, *a*, found near an old living-place on the north bank of the Fraser, just above Lytton, is believed, judging by its worn ends, to have been used as a hand-hammer for domestic purposes.

WAR-PICKS

An interesting question arises regarding the war-pick, the handsomest and most perfectly finished form of jade implement known to the Northwest coast. This type, from 8 in. to 17 in. in length, preferably of any hard, close-grained stone, is common to the Tsimshian, Haida, and Tlingit; it is



FIG. 3.—
Drill with
wooden han-
dle. (Length,
10½ in.)

PLATE XII

Hafted adze consisting of a blade of yellow-green jade seized to a handle of caribou-horn with whalebone. From Kotzebue sound, Alaska.



hafted through or at the end of a short, stout, wooden handle, and is essentially a warclub. The Tsimshian call it *nascak* (killer); the Kitikshan of the upper Skeena, *darees*; the Tlingit, *ka-too* ('turned up'). But made of jade it was very rare, and being the most highly valued of stone pieces, it was possessed only by a few of the greater chiefs. From the fact that it was used on ceremonial occasions to kill slaves, the term "slave-killer" has been applied to it by collectors. The writer can account for six of these implements, and possibly others, gathered by early explorers, may be found in European collections.

A description of one in the writer's possession (pl. ix, b) will answer generally for the others. This was an hereditary piece in the family of the Tahlqwayde, or Tahlkoedi, of the Stikine tribe of Tlingit, living at Wrangel. On the marriage of the headchief's daughter to Choquette, a French Canadian in the employ of the Hudson's Bay Company, about 1865, it was presented to him as the most treasured

of the tribal possessions. It is of a homogeneous, deep-green jade, with slight veins of a darker color. It is 17 in. in length, $1\frac{3}{8}$ in. in greatest depth of body, and 1 in. thick at the center. The blade is quite straight for two-thirds of its length to a slight ridge on the upper surface, from which it curves downward, decreasing gradually in dimension, and terminating in a dull, rounded point. It is hexagonal in cross-section, and a central ridge extends along the lateral sides, gradually decreasing in prominence toward the curved end until lost. The head or cutting edge is convex, and stands vertical when mounted. Such pieces among the Tlingit were hafted through an opening near the end of a short, stout, wooden handle, the head, with two-thirds of the body, projecting in front, and the curved, pointed end in the rear.

Another specimen, of bright-green, translucent jade, hafted through the end of a short, stout, wooden handle (pl. x), was collected at Sitka, Alaska, and is now in the United States National Museum at

PLATE XIII

a. Celt of pale, gray-green jade with yellow-brown mottling. It shows two shallow grooves on one face and one on the other. Used as an adze or a skin-scraper. From Port Clarence, Alaska.

b. Celt of brilliant, translucent, grass-green jade, homogeneous in texture, inserted in the end of a section of bone and used as a skin-scraper. From Point Hope, Alaska.

c. Celt of yellow-green, mottled jade, which in use was inserted in the end of a section of bone and used as an adze. Brought to Nome from the Siberian coast.



Washington. It is similar in form to the one described. The length of the blade is 16 in., and of the handle, $23\frac{3}{4}$ in.

Another war-pick, now in the American Museum of Natural History, New York, was obtained by the writer from a native of the Kake tribe of the Tlingit, at Security bay, Kuiu island, southeastern Alaska. It was found at the head of the bay, on the site of a stockaded fort that was burned in 1869. The entire surface of the implement is decomposed and whitened, showing the light-green of the jade in irregular veins, due probably to the effect of heat. It is similar in shape to the others described, except that there is no projecting ridge on the upper face. Its dimensions are: length, $17\frac{3}{4}$ in.; greatest width of lateral sides, $1\frac{3}{4}$ in.; maximum thickness, $1\frac{1}{4}$ in. It is hexagonal in cross-section, and tapers in width and thickness to the ends. The pick was later hafted through the end of a short, heavy handle of wood, which is carved in animal and crest designs in low relief.

Another specimen, much heavier in proportion, and showing a white surface from decomposition, is also in the American Museum of Natural History. It was procured at or near Sitka, but the exact locality is unknown. It measures $11\frac{1}{2}$ in. in length, $20\frac{5}{8}$ in. in greater breadth of lateral sides, and $1\frac{1}{2}$ in. in maximum thickness, tapering near the ends. The smaller and rear end presents a greater and shorter downward curve.

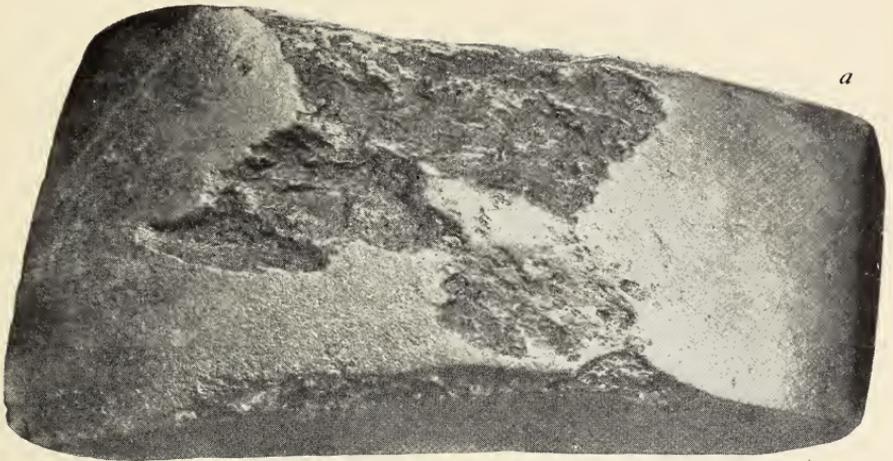
Still another war-pick, of pale-green jade, from the Tsimshian of British Columbia, is in the Bishop collection of the Metropolitan Museum of Art, New York. It shows a shallow groove on the upper face nearer the rear. The smaller end is somewhat broken, and, possibly on this account, shows less curvature.

A war-pick collected on Graham island, of the Queen Charlotte group, is mentioned and illustrated in a paper by Alexander Mackenzie in the *Transactions of the Royal Society of Canada*, for 1891. It is "of light-green jade," and in shape is referred to one of common stone pictured in

PLATE XIV

a. Double-bitted celt of blackish-green mottled jade. It shows three shallow grooves on one face, and may have been used as a warclub. From Hotham inlet, Kotzebue sound, Alaska.

b. Hand-hammer or pestle made of a natural oblong boulder of dark-green jade, veined and mottled in darker colors. It is grooved around nearer one end for a thong to secure it in the sled or boat while traveling. It was brought to Nome from the Siberian coast.



Mackenzie's pl. VIII, which is lashed to the end of a short, wooden handle, as shown in our fig. 4. This style of hafting is different from that of the Tlingit, among whom the stone was wedged in a corresponding hole through the handle.

The Krause brothers procured one of these implements among the Tlingit in 1882; it is in the Natural History Museum of Bremen, Germany.

Two interdependent questions naturally arise in considering these war-picks: Who made

them? and Whence was the material obtained? From its distribution among the Tsimshian, Haida, and Tlingit, it would seem that at least one of these people was responsible for the origin of this type of weapon, as it was common to all of them; but there is no known deposit of jade on the coast, and no evidence, except for a few

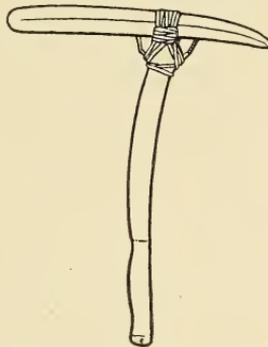


FIG. 4.—War-pick from Graham island (after Mackenzie).

small, stray, cut boulders, that they worked jade. In fact, from the great value with which these Indians regarded the small adze-blades, and from the scant testimony available, it would seem that jade was procured wholly in trade from the south. In order to fashion jade objects of such length, boulders of the largest size worked by the Fraser River Salish would have been necessary; yet thus far nothing of this size has been found within their habitat, nor is there any evidence of the necessary working tools. These blades are as long as the longest chisels found among the Fraser River Salish, but no specimen of this particular type has ever been seen on the Fraser among the hundreds of worked or partly worked pieces of various shapes that have been dug up on the oldest occupied sites. For these reasons the question of the origin and manufacture of this class of jade implements remains unanswered.

From every evidence we possess, the Tlingit, Tsimshian, and Haida are made up of different elements that have become

PLATE XV

a. Woman's knife of yellow-greenish, black jade, showing perfect moss stains. From the coast of Point Barrow, Alaska.

b. Woman's knife of yellow-green, black-mottled jade. It is slightly concave on one face, and shows a broad, shallow groove the length of the other face, which serves as a finger-grip. It had been traded from the Siberian coast to Nome peninsula.

c. Woman's knife of yellow-green jade, shading to reddish black. From Point Barrow, Alaska.



a



b



c

amalgamated through migration and intermarriage, and while a hazy tradition of the coming of a small band of people, supposedly Asiatics, from seaward, who settled about the shores of Dixon entrance in the earliest times, existed in the minds of the oldest Tlingit, yet there is no doubt, if one may judge by the family stories, that the coast was settled from the interior by way of the greater rivers, and it may be that in times much earlier than those of which we have proof or knowledge, these emigrants may have had access to deposits of jade unknown today, and that the interesting pieces referred to may have been carried coastwise by them.

The only ornamentally carved piece of jade the writer ever saw or heard of along the Northwest coast or in the interior, was procured from a Tlingit in southeastern Alaska, and was worn suspended about the neck as a scratcher. In shape and size it represents a canine tooth of the brown bear.

ESKIMO USE OF JADE

Source.—The discovery of the so-called Jade mountains in Alaska by Lieutenant

Stoney, before referred to, solved the problem of the origin of the abundance of nephrite implements scattered along Bering sea and the Arctic shores. This isolated range, some thirty miles in extent, well above the Arctic circle, between the Kowak and Noatak rivers, 130 miles inland from Kotzebue sound, is partly described by Assistant Engineer S. B. McLenegan⁴ in the following terms:

On the eastern end of the range there are cliffs of serpentine rock. . . . Among the river natives were found two or three axes of this material. . . . Near the western end we found quantities of a light-green rock. This is very hard and compact, and bears no resemblance to the serpentine formation. . . . The stone is possibly an imperfect nephrite. The latter is never found in quantities, generally in 'pockets' only—although nothing of the kind came under our observation. Nephrite was undoubtedly obtained in these mountains. The exact place, however, is unknown to the present generation of natives. . . . It appears that these mountains have never been visited by the natives. There are many superstitions connected with them.

The fear that must have been inherited through generations might indicate that

PLATE XVI

a. Man's small knife consisting of a slender blade of pale-green jade, set in the end of a horn handle, which is grooved to fit the fingers and with holes on the end for a lanyard to secure it to the belt or to hang it when not in use. From the Cape Nome coast, Alaska.

b. Man's hunting knife, a fine leaf-shape blade of translucent gray-green jade. It is sharpened along the more curved edge. The tang indicates that it was set into a handle like *c.* From Kotzebue sound, Alaska.

c. Man's hunting knife complete. The blade, of dull-green jade, is set in a handle of caribou-horn seized at the opening with walrus-hide. From an old village-site on the Bering coast of Seward peninsula.



the Eskimo had never reached the mountains, but, like the southern natives, had procured all the mineral that they required from float and boulders in the river-beds, as those who have ascended these rivers speak of the abundance of greenstone in sight. We know very little as to the method of working jade by these northern people. Murdoch⁵ states that jade was sawed with thin bone saws, sand and water. Nelson⁶ observed that nephrite and other hard stones were fashioned by the Eskimo by grinding into shape with other stones. Stefánsson⁷ says:

Among Noatagmiut (and most other tribes?) greenstone *kuiñirk* bowls were drilled with flint. . . . Attoktuak (of Point Barrow) says jade was cut into long strips with a sharp cottonwood stick the edge of which was occasionally dipped in water and then in dry sand. Noatak people say they never saw or heard of this method. Thin slabs of flint were used, the edge dipped now and then in water and then in dry sand. Slabs of jade were smoothed by rubbing on a flat stone (sandstone) covered with sand. This smoothing practised inland and at Barrow, many of all tribes still living who saw jade worked.

Uses.—The Eskimo used jade for a much greater variety of implements than did the Salish and the tribes of the southern coast, and they showed much more individuality in the different forms of the same type of object. Their most valued personal ornament, the man's labret, was often made of jade.

Celts and Adzes.—The adze, the principal edged tool for wood, bone, and ivory working, was in two forms, as illustrated in pl. XI-XIII. The larger blade was hafted directly by means of a rawhide lashing to a short, bent bone, horn, or wooden handle; the smaller one was inserted in the end of a short section of caribou-horn, which was fitted to and seized in like manner to a similar handle. The lashings were put on wet, and the handles were expanded at the lower end or drilled in one or several holes, over or through which the seizing passed. An adze in the writer's possession is secured to the handle with a whalebone seizing. In some instances the handle was ornamentally etched.

Hammers.—Hammers, which were more

PLATE XVII

Skin-scrapers of the type used by the Eskimo of Bering sea from Bristol bay to the head of Norton sound. It consists of a blade of light-green jade shading to black, fitted and lashed to a bent-wood handle with a narrow strip of walrus-hide. From Nome peninsula, Alaska.



often of pectolite, used as bone-breakers or whenever a maul was required, were crude affairs, consisting generally of natural, elliptical bowlders, or of pieces of convenient size, pecked into shape, and flattened at the end (pl. xiv). They were hafted in the same manner as the adzes.

Knives.—Knives, for which no substitute equal to jade could be found in primitive times, were very different for the sexes among the Eskimo. The *ulu*, or woman's knife (pl. xv), was quite uniform in shape, consisting of a thin, crescentic blade, ground down to a keen edge along the curved portion. Some were inserted in the groove of a handle of ivory, bone, or wood, which was often ornamentally carved; others were smoothed along the upper straight edge, which was generally expanded, and in some instances a groove on one or both sides was provided, seemingly for the purpose of giving the hand a better hold of the blade. This tool was the constant companion of the woman, and was used for every possible purpose, from splitting fish to cutting a thread.

The man's knife, as a weapon of war and for hunting purposes, was generally of flint or slate (pl. xvi). It consisted of a short blade set in a wooden or a bone handle, but when of nephrite the length of blade was usually much greater, reaching eight inches. Of war knives, possibly the finest specimen, now in the National Museum, was collected by Nelson in Norton sound. It is a leaf-shaped blade, $8\frac{1}{3}$ in. long by $2\frac{1}{4}$ in. wide, and is made of a beautiful, bright, translucent, green jade, slightly grooved near each edge, and strengthened by an increase in the thickness down the middle. It is pegged to a short ivory handle, and as it has a double edge, it was more of a weapon than a hunting knife.

The two hunting knives in the writer's possession are interesting examples. The larger one (pl. xvi, *b*) is of a beautiful, gray-green, translucent jade, $7\frac{1}{2}$ in. long and $2\frac{1}{8}$ in. wide, with a slightly raised strengthening ridge extending down the middle of each side. It is broad, leaf-

PLATE XVIII

a. Skin-scrapers of the type used by the Eskimo of northern Alaska. It consists of a blade of green jade set in the end of a handle of extinct mammoth ivory. The hand-piece is grooved on the top and one side for the first two fingers and the thumb. From the Arctic shore near Point Beecher, Alaska.

b. The other side of the same scraper.

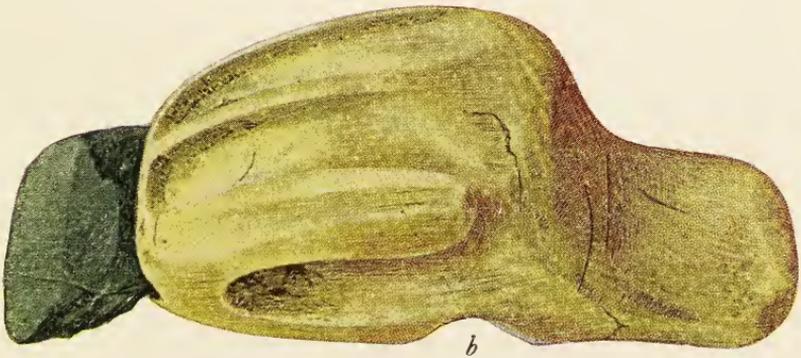
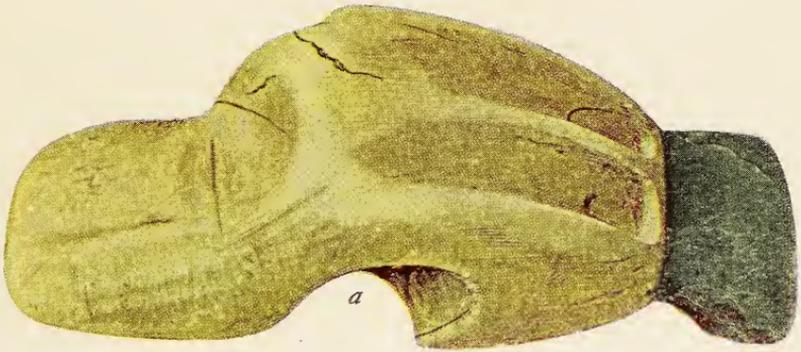




PLATE XIX

a. Whetstone of homogeneous, deep olive-green jade, oval in cross-section. From Hotham inlet, Kotzebue sound, Alaska.

b. Whetstone of pale-green jade, flattened in cross-section and slightly curved in its length. From Kotzebue sound, Alaska.

c. Whetstone of dark olive-green jade, rounded in cross-section and showing a shallow groove in its length. The upper end is secured and covered with seal-skin, and a thong is provided to fasten it to the belt. From the Bering coast of the Nome peninsula, north of Cape Nome, Alaska.

d. Whetstone of milky pectolite, four-sided, but rounded in cross-section. Through the hole in the end a seal-skin thong is spliced for attachment to the belt.

e. Whetstone of a blue-gray jade, finished throughout, deeply grooved, and pierced with a long eye at the upper end. From the coast of Seward peninsula, Alaska.



a



b



c



d



e

shaped, with a rounded cutting edge on one side. This was primarily a skinning and hunting knife, and, judging by the two-inch tang at the upper end, it evidently was once secured to a handle.

The other knife (pl. xvi, *c*) is interesting from the fact that it is provided with the original handle. The blade, of inferior jade, $5\frac{3}{4}$ in. long, is rounded to a dull point, with a single cutting edge. The inch tang is clearly cut, and fits in the end of a short, tapering, horn handle, wrapped around with hide at the lower end. Such knives were carried in wooden sheaths attached to the belt.

Skin-dressing Tools.—As furs and skins constituted the most important articles in the economic life of the Eskimo, their clothing, tents, boats, dog-harness, and portions of their hunting and fishing equipment all coming from reindeer, seal, walrus, bear, and the smaller fur-bearing mammals, skin-dressing tools were indispensable. Most abundant were the scrapers for removing the fat and adhering bits of flesh. While slate and chipped-flint blades were

more commonly employed for this purpose, jade also was used. From Bristol bay northward to the head of Norton sound, the scraper consisted of a short stone blade fitted to or set on the end of a bent-wood or bone handle, and seized with rawhide (pl. xvii). Among the Arctic Eskimo north of Bering strait the stone blade was inserted in a short handle of ivory, bone, or wood, which was made to conform to the inside of the hand with hollowed-out grooves in which the fingers and thumb fitted exactly (pl. xviii).

Whetstones.—For giving a keen edge to the knife, whetstones, usually of jade, were carried by means of a lanyard or a strip of sealskin, suspended from the belt, but smaller ones were often attached to the primitive needle-case (pl. xix). An examination of any of the whetstones will show cross-cuts or lines from use. These tools vary in length from two to nine inches, and in cross-section, while approaching the cylindrical, they are often oval or flattened. The upper end is generally chamfered for convenience in drilling the eye, through

PLATE XX

a. Chisel consisting of fine, homogeneous, gray-green jade, set in the end of a long handle of bone and wood lashed together with hide. From St Michaels, Alaska.

b. Hand chisel of homogeneous, dark-green jade, square in cross-section, with a long, tapering edge. Broken, but scarfed with pieces of wood and a seal-skin lashing. The chisel shows three shallow longitudinal grooves. From Kotzebue sound, Alaska.

c. Chisel or graving tool with a blade of translucent, grass-green jade, slightly oval in cross-section and brought to a rounded point; set in the end of a handle of walrus ivory. From Seward peninsula, Alaska.

d. Chisel consisting of a thin, flat blade of bright-green jade inserted in the end of a handle of caribou-horn ornamented with a line of round holes. From Cape Nome, Alaska.

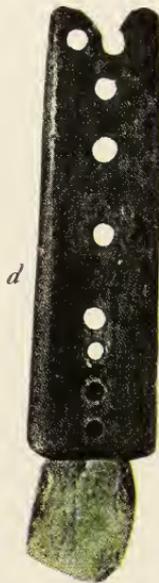
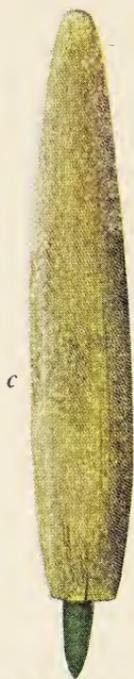
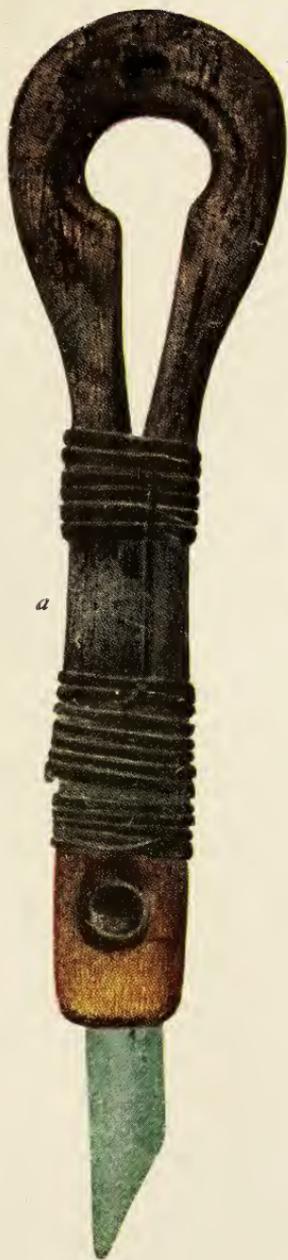
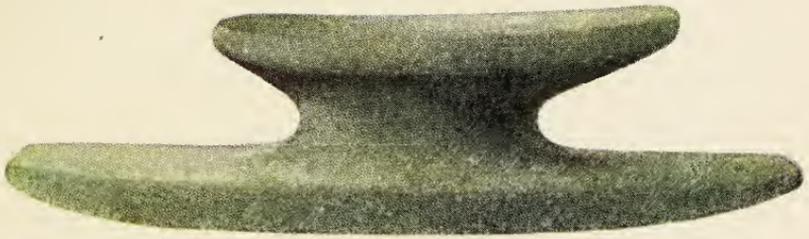


PLATE XXI

Two views of a labret of homogeneous, olive jade, ornamented with a narrow groove (*b*) cut along the outer face, and beveled at the ends. The button (*a*) has a longer and a shorter arm for insertion. Rare and finely fashioned.



a



b

which the lanyard is rove, to attach it to the belt or the needle-case. The drilling of the eye must have been a delicate and laborious operation, and to facilitate it a deep, longitudinal groove was worked in one or both sides, thus reducing the thickness of the wall to be drilled. In some cases the eye was drilled partly through from each side to meet in the middle. Instead of thus piercing the stone for a thong, the rough end was sometimes tightly covered with seal-skin, with a thong attached. The lower end was rounded, pointed, or flattened, as most convenient.

Chisels.—For working in wood, ivory, and bone, chisels were next in importance to adzes. These consisted of short, narrow blades of jade, usually set in the end of a handle of bone or ivory. Pl. xx shows several forms of hafted chisels. Of these, *a*, an unusually fine specimen, is provided with a blade of homogeneous gray-bluish-green jade, free from flaw, inserted in the end of a section of caribou horn, which is fitted and seized with hide to a handle of wood. The hole in one side of the handle

would suggest that it was originally used for some other purpose. Fig. *c* is an equally fine specimen, possibly more of a graving tool, judging by its rounding point, which consists of a translucent grass-green jade, oval in cross-section, set in the end of a short handle of walrus ivory, which tapers at both ends. It came from the seacoast of Seward peninsular, Alaska. Fig. *d* is of the more common type of chisel. The flat blade is inserted in the end of a caribou-horn handle ornamented longitudinally with a series of holes. It is from Cape Nome. Fig. *b* exhibits a remarkable specimen that is not mounted; it is square in cross-section, with a long bevel on four sides. This chisel is doubly interesting in that it shows the ingenuity of the Eskimo in the neat piece of work in scarfing with two pieces of wood, and a rawhide lashing to bind the parts together where broken.

Drills.—Drills were important tools, and were made of bone, flint, and jade; when of jade they were generally of the finest quality. So far as known, the point was always triangular, and was inserted

PLATE XXII

a. Spearhead used in the capture of whale, walrus, and seal, consisting of a blade of jade fitted between the jaws of a bone head and secured by means of two bone pegs. The blade, of light-green flecked with white and yellow markings, is of leaf-shape and well fashioned. The central portion of each side is slightly concave to fit the bone jaws, and both edges are beveled to a sharp point throughout their length. From Kotzebue sound, Alaska.

b. Unique, finely shaped arrow-barb of mottled green jade, which in use was fitted in the end of a wooden shaft. It seems remarkable that so much labor should have been expended in working this barb from jade, when bone or ivory would have been equally efficient. From Point Barrow, Alaska.

c. Spearhead of bright, translucent, grass-green jade. It was found worn suspended from the neck of a man living on the shore of Bristol bay, Alaska, who regarded it as having certain magical power as a charm.



c



b



a

PLATE XXIII

Spoon-shape implement of bright-green, splotched and veined jade. Dug up on an old village-site on the Arctic coast, near Cape Prince of Wales, Alaska. Use unknown.



in the larger end of a slightly tapering, rounded, wooden rod, which was revolved back and forth with the bow-drill, or string of hide and toggles.

Labrets.—Possibly the rarest and most highly valued articles of jade were the labrets worn by Eskimo men, which in some cases have been transmitted from generation to generation, or dug from sites of old habitations. The one here shown (pl. XXI), procured in 1880 in Hotham inlet, is of an olive shade, of fine, homogeneous texture, beautifully fashioned, and remarkable for a narrow groove cut along three-quarters of the length of the outer face for ornamentation. It is quadrangular, with two rounded sides, and is beveled at the ends. The button, which passed through the lip and rested against the gums, has a longer and a shorter arm for insertion and to hold the labret securely in place. The making of such delicate objects of so hard and brittle a material as jade, with sandstone, flint, and grit, which were the only means at the disposal of their makers, is an object lesson to the skilled workers

of today, possessed with every modern appliance.

Lesser Implements.—The smaller articles of jade, such as harpoon, spear, and arrow blades and barbs (pl. xxii), are noteworthy products of native patience and art, especially when it is remembered that they were fashioned with primitive tools before the introduction of iron or steel. Three remarkable spoon-shape objects, one of which is shown in pl. xxiii, were dug up on a prehistoric living-site on the coast of Bering sea, near Cape Prince of Wales, Alaska. Their use is unknown, and the natives could give no information regarding them.

PLATE XXIV

Two views of a skin scraper of the type used by the Eskimo of northern Alaska. It consists of a celt of dark-green jade set in a handle of wood.

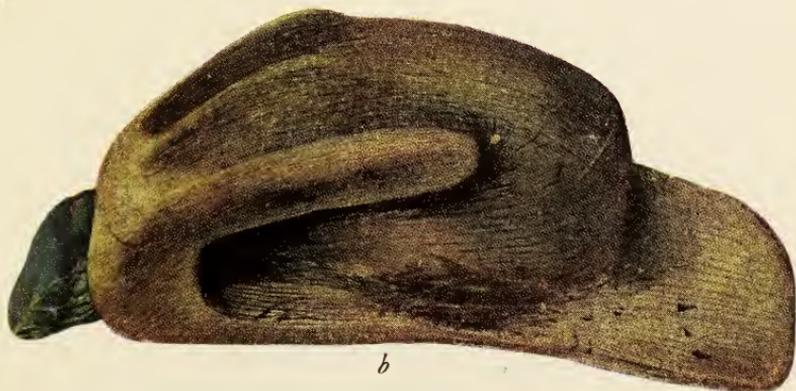
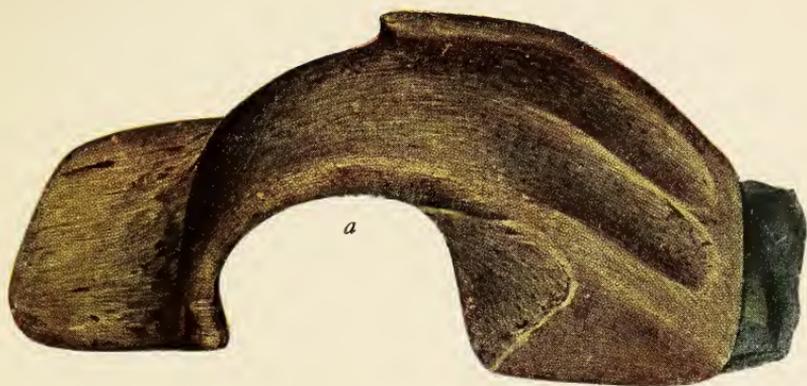


PLATE XXV

Two views of a jade celt, showing secondary cutting.
From Fraser river, British Columbia.



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